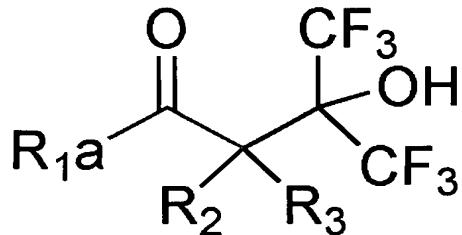


CLAIMS

1. A fluorine-containing cyclic compound represented by the following general formula (1):

5 [Chemical Formula 30]



(1)

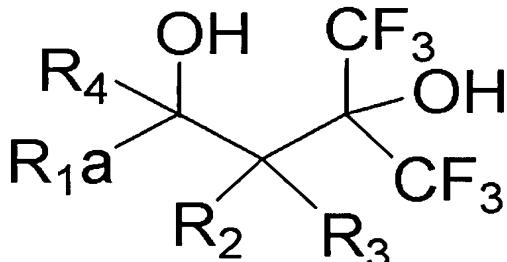
in the general formula (1), R_{1a} is a C₁-C₂₅ cyclic alkyl group, cyclic alkenyl group or cyclic alkynyl group; each of R₂ and R₃ is independently a hydrogen atom, a halogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic

10 alkyl group; and each of R_{1a}, R₂ and R₃ may contain fluorine atom, oxygen atom, sulfur atom, nitrogen atom or an atomic group containing a carbon-carbon double bond.

2. A fluorine-containing cyclic compound represented by the following

15 general formula (2):

[Chemical Formula 31]



(2)

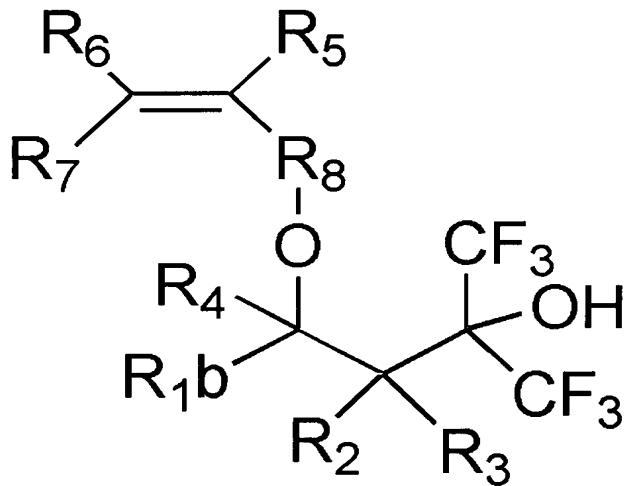
in the general formula (2), R_{1a} is a C₁-C₂₅ cyclic alkyl group, cyclic alkenyl group or cyclic alkynyl group; each of R₂ to R₄ is independently a

20 hydrogen atom, a halogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic

alkyl group; and each of R1a and R2 to R4 may contain fluorine atom, oxygen atom, sulfur atom, nitrogen atom or an atomic group containing a carbon-carbon double bond.

5. 3. A fluorine-containing cyclic compound represented by the following general formula (3):

[Chemical Formula 32]

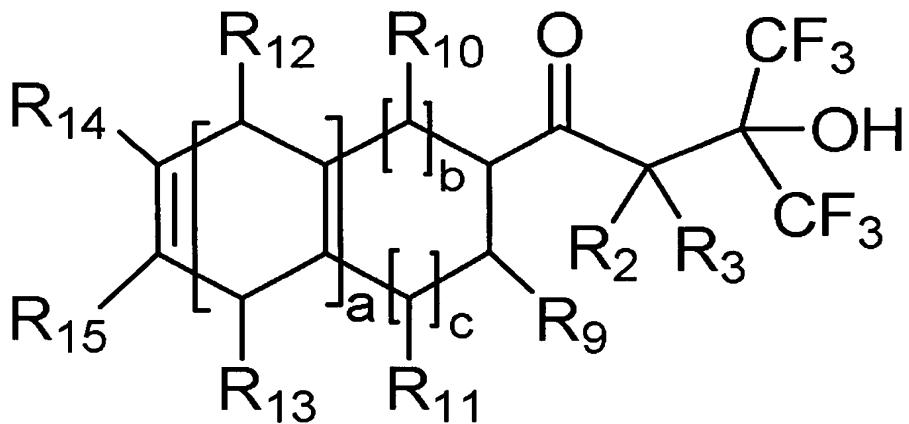


(3)

in the general formula (3), R_{1b} is a C₁-C₂₅ cyclic alkyl group, cyclic alkenyl group, cyclic alkynyl group, aryl group, or heterocyclic group, and may contain fluorine atom, oxygen atom, sulfur atom, nitrogen atom or an atomic group containing a carbon-carbon double bond; each of R₂ to R₇ is independently a hydrogen atom, a halogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, nitrogen atom or an atomic group containing a carbon-carbon double bond; and R₈ is a carbonyl group or methylene group, or a single bond.

4. A fluorine-containing cyclic compound represented by the following general formula (4):

20 [Chemical Formula 33]

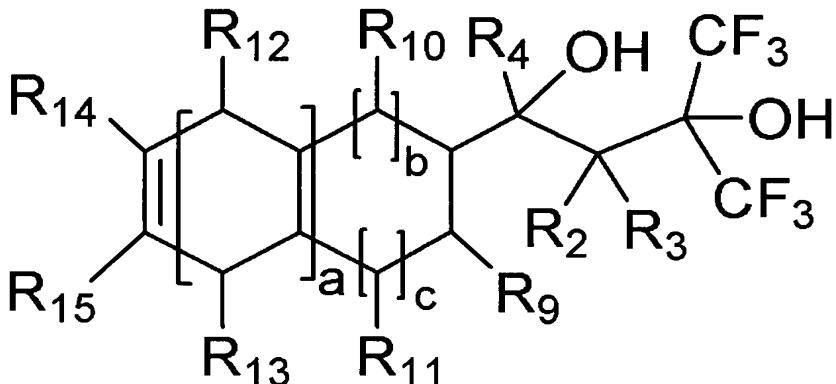


(4)

in the general formula (4), each of R2, R3 and R9 to R15 is independently a hydrogen atom, a halogen atom, or a C₁–C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, 5 sulfur atom, or nitrogen atom; R10 and R11 or R12 and R13 may be bonded together to form a ring; in such case, it is an C₁–C₂₅ alkylene group that may contain oxygen, sulfur, nitrogen or hetero atom; and "a" is 0 or 1, "b" is an integer of 0–2, and "c" is an integer of 0–2.

10 5. A fluorine-containing cyclic compound represented by the following general formula (5):

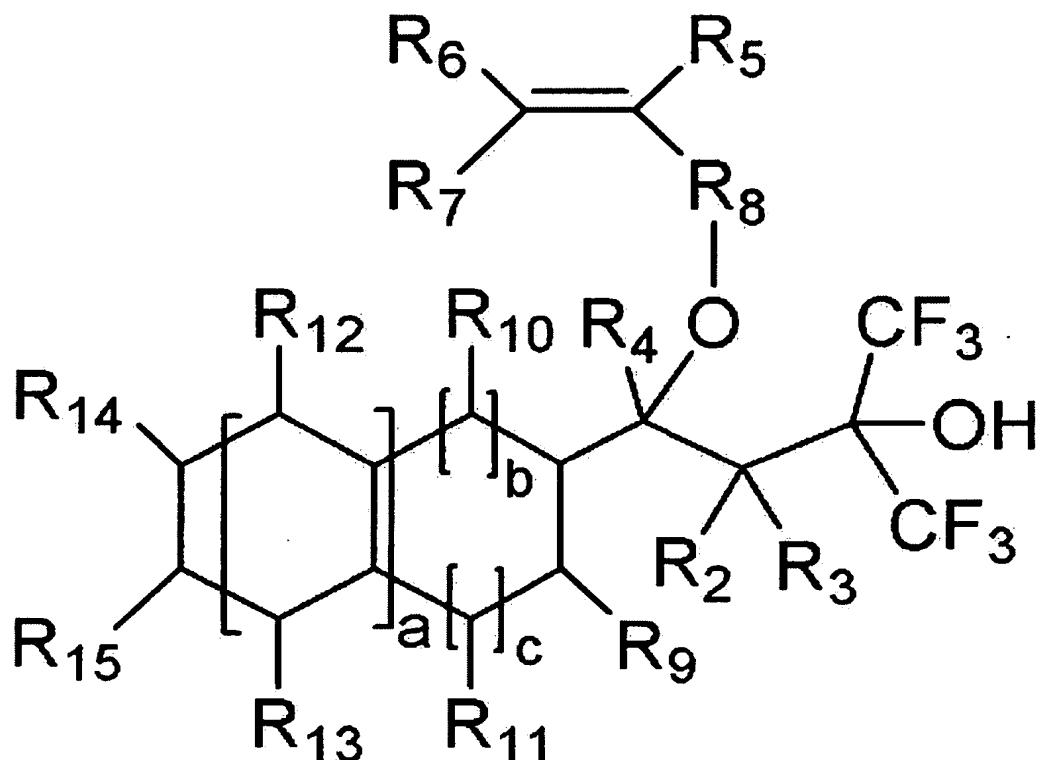
[Chemical Formula 34]



(5)

in the general formula (5), each of R₂ to R₄ and R₉ to R₁₅ is independently a hydrogen atom, a halogen atom, or a C₁·C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, or nitrogen atom; R₁₀ and R₁₁ or R₁₂ and R₁₃ may be bonded together to form a ring; in such case, it is an C₁·C₂₅ alkylene group that may contain oxygen, sulfur, nitrogen or hetero atom; and "a" is 0 or 1, "b" is an integer of 0·2, and "c" is an integer of 0·2.

6. A fluorine-containing cyclic compound represented by the following general formula (6):
10 [Chemical Formula 35]



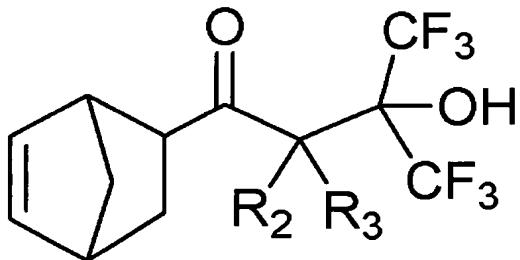
(6)

in the general formula (6), each of R₂ to R₇ and R₉ to R₁₅ is independently a hydrogen atom, a halogen atom, or a C₁·C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom,

sulfur atom, or nitrogen atom; R8 is a carbonyl group or methylene group or a single bond; R10 and R11, R12 and R13, or R14 and R15 may be bonded together to form a ring; in such case, it is an C₁·C₂₅ alkylene group that may contain oxygen, sulfur, nitrogen or hetero atom; and "a" is 0 or 1, "b" is an integer of 0·2, and "c" is an integer of 0·2.

5 7. A fluorine-containing cyclic compound represented by the following general formula (7):

[Chemical Formula 36]



10

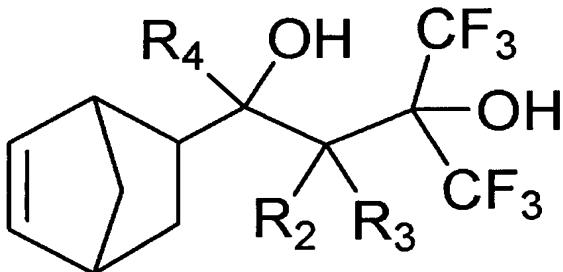
(7)

in the general formula (7), each of R2 and R3 is independently a hydrogen atom, a halogen atom, or a C₁·C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, or nitrogen atom.

15

8. A fluorine-containing cyclic compound represented by the following general formula (8):

[Chemical Formula 37]



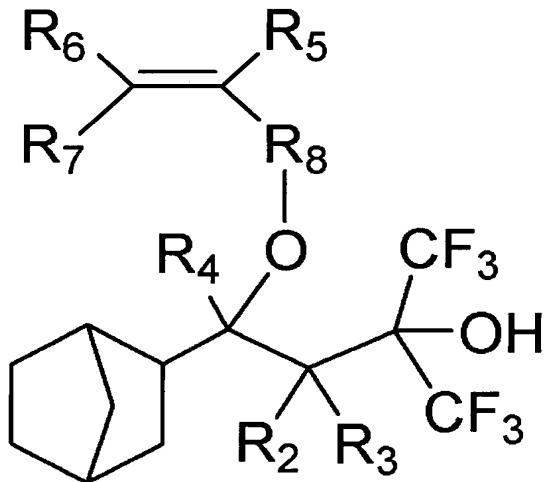
(8)

in the general formula (8), each of R₂ to R₄ is independently a hydrogen atom, a halogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, or nitrogen atom.

5

9. A fluorine-containing cyclic compound represented by the following general formula (9):

[Chemical Formula 38]

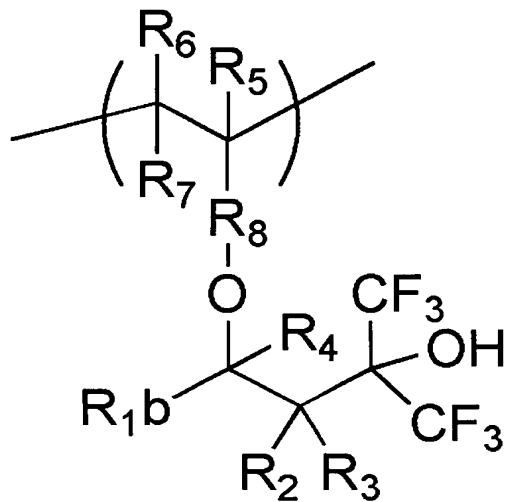


(9)

10 in the general formula (9), each of R₂ to R₇ is independently a hydrogen atom, a halogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, or nitrogen atom; and R₈ is a carbonyl group or methylene group or a single bond.

15 10. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000, which is characterized in comprising a repeating unit represented by the following general formula (10):

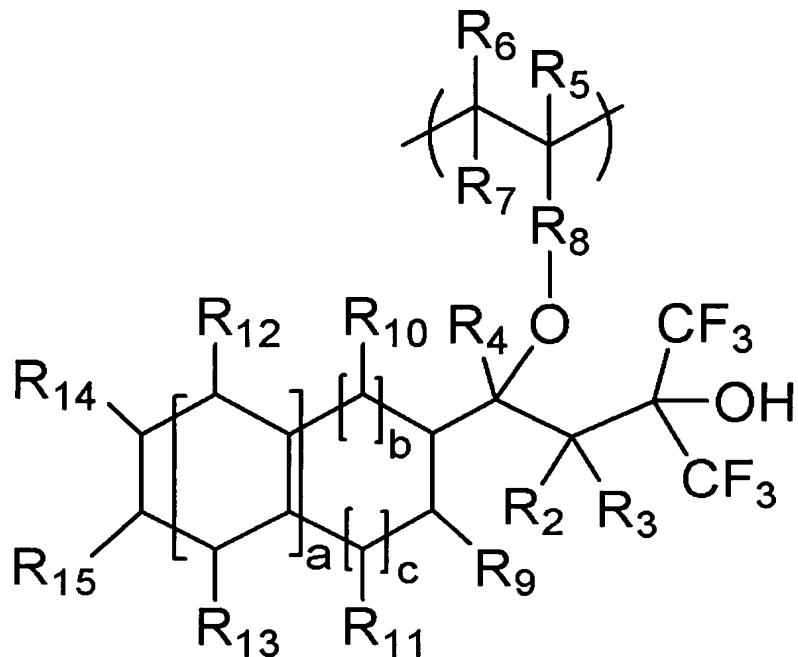
[Chemical Formula 39]



(10)

in the general formula (10), R1b and R2 to R8 are defined as in claim 3.

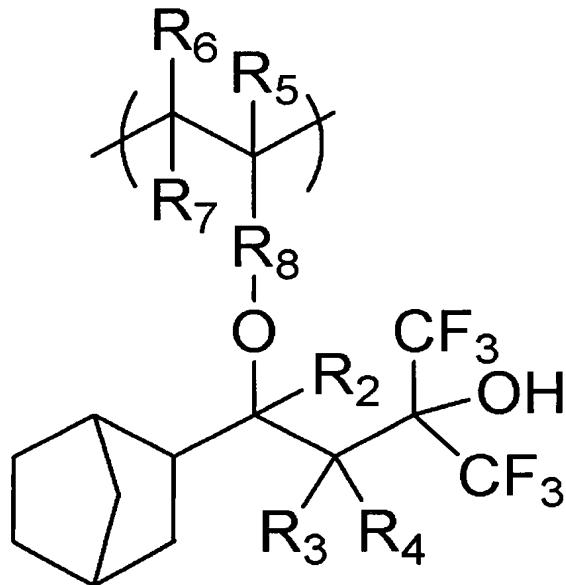
11. A fluorine-containing polymer compound having a weight average
 5 molecular weight of 1,000 to 1,000,000, which is characterized in comprising a
 repeating unit represented by the following general formula (11):
 [Chemical Formula 40]



(11)

in the general formula (11), R2 to R15 and a, b and c are defined as in claim 6.

12. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000, which is characterized in comprising a repeating unit represented by the following general formula (12):
5 [Chemical Formula 41]

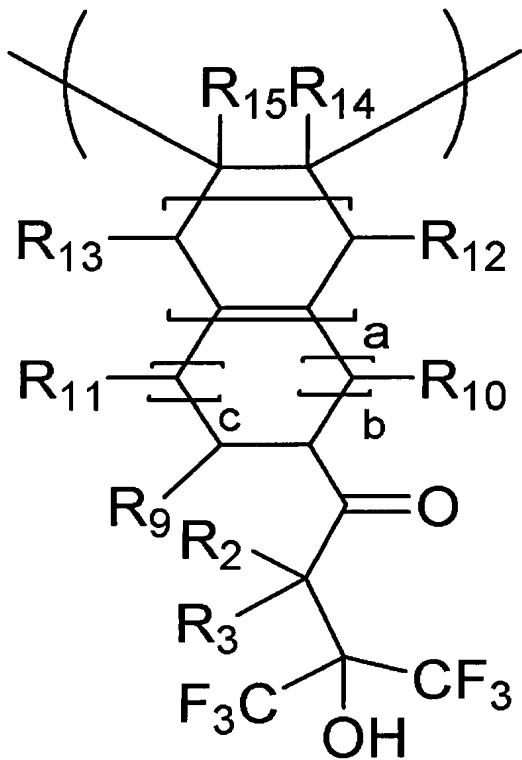


(12)

in the general formula (12), R2 to R8 are defined as in claim 9.

10

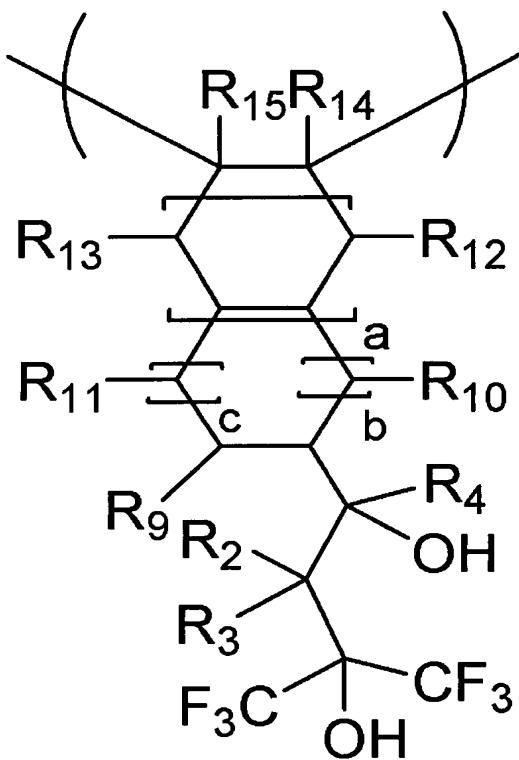
13. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000, which is characterized in comprising a repeating unit represented by the following general formula (13):
[Chemical Formula 42]



(13)

in the general formula (13), R2, R3 and R9 to R15 and a, b and c are defined as in claim 4.

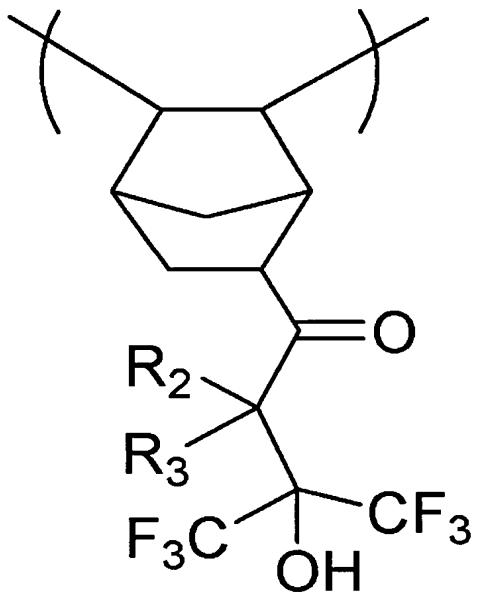
5 14. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000, which is characterized in comprising a repeating unit represented by the following general formula (14):
 [Chemical Formula 43]



(14)

in the general formula (14), R2 to R4 and R9 to R15 and a, b and c are defined as in claim 5.

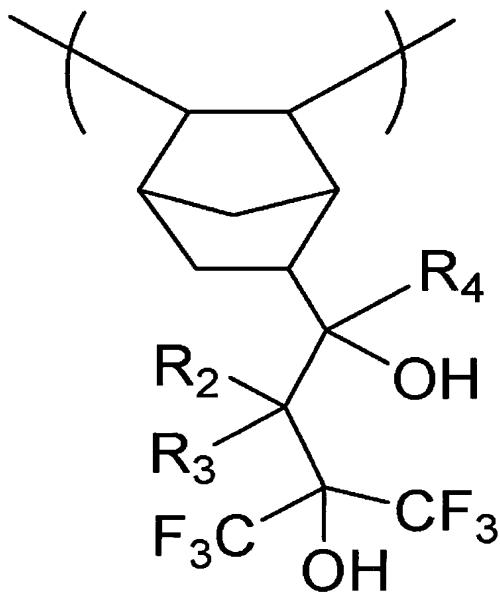
5 15. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000, which is characterized in comprising a repeating unit represented by the following general formula (15):
 [Chemical Formula 44]



(15)

in the general formula (15), R₂ and R₃ are defined as in claim 7.

16. A fluorine-containing polymer compound having a weight average
5 molecular weight of 1,000 to 1,000,000, which is characterized in comprising a
repeating unit represented by the following general formula (16):
[Chemical Formula 45]

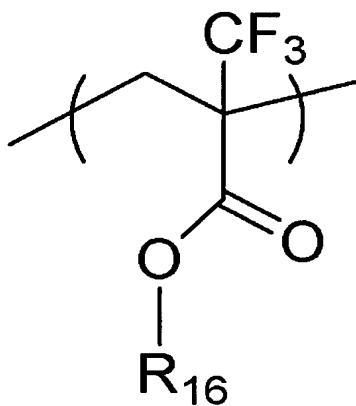


(16)

in the general formula (16), R₂ to R₄ are defined as in claim 8.

17. A fluorine-containing polymer compound having a weight average molecular weight of 1,000 to 1,000,000 according to claims 13 to 16, which is characterized in comprising a repeating unit represented by the following general formula (17):

[Chemical Formula 46]



(17)

in the general formula (17), R16 is a hydrogen atom, or a C₁-C₂₅ straight-chain, branched or cyclic alkyl group, and may contain fluorine atom, oxygen atom, sulfur atom, nitrogen atom, hydroxyl group or hexafluorocarbinol group.

5

18. A fluorine-containing polymer compound according to any one of claims 10-17, which is characterized in comprising a repeating unit having an acid-labile group.

10 19. A fluorine-containing cyclic compound or fluorine-containing polymer compound according to any one of claims 1-18, which is characterized in that hydroxy groups contained in the molecule are partially or entirely protected with protecting groups.

15 20. A resist material characterized in comprising a fluorine-containing polymer compound according to any one of claims 10-19.

21. A chemically-amplified resist material characterized in comprising a resist material according to claim 20 and a photoacid generator.

20

22. A pattern forming process characterized in comprising at least the steps of applying a resist material according to claim 20 or 21 to a substrate; subjecting the substrate to a heat treatment; conducting an exposure, using a high-energy ray of a wavelength of 300nm or less or an electron beam, through 25 a photomask; subjecting the exposed resist film to a heat treatment; and conducting a development treatment.

23. A pattern forming process according to claim 22, wherein the high-energy ray used is F₂ excimer laser, ArF excimer laser, KrF excimer laser 30 or soft X-ray.